SHOES ON TRIAL: DOES A SAFE SHOE EXIST FOR OLDER PEOPLE?

[1] Bridget J Munro, [1]Karen J Mickle, [2]Jasmine C Menant and [1,]Julie R Steele
[1]Biomechanics Research Laboratory, University of Wollongong, NSW, Australia, web: www.uow.edu.au/health/brl
[2]Prince of Wales Medical Research Institute, NSW, Australia, web: www.powmri.unsw.edu.au/fbrg

INTRODUCTION

More than 80% of older people report foot problems and, as a result, tend to wear unstructured footwear that moulds to the shape of their deformed feet. While these unstructured shoes are deemed comfortable, it has been speculated that they contribute to home falls and hip fractures in the older population [1]. However, as walking barefoot or in socks has also been associated with an increased risk of falls in older people [2], we need to design safe but comfortable shoes for older people to wear in and around the home.

Although there is a myriad of research investigating athletic footwear design, little research addresses shoe design for older people. In fact, less than 100 papers address footwear for older people, predominantly only reporting the shoes worn at the time of a fall. Of the studies that have addressed the effects of footwear on balance, the focus of this research has been outdoor shoe types. As a result, the specific features that should be incorporated into household footwear for older people are unknown. Therefore, this paper aims to confirm what older people wear on their feet around the home and propose which individual features of an shoe are considered safe (i.e. shoes that facilitate gait and balance) for older people to wear in the home.

METHODS

Data were drawn from relevant field- and laboratory-based research studies conducted by members of the Biomechanics Research Laboratory, University of Wollongong which have involved the participation of over 500 older people (60 years and above). Shoe wearing habits were assessed by self-administered survey. Postural sway, maximal balance range, choice reaction stepping time and coordinated stability were assessed using the Lord sway-meter and a lighted foot board [3]. Walking patterns were assessed using standard biomechanical laboratory procedures (kinematics, kinetics and neuromuscular control patterns) in conjunction with subjective perceptions. The shoe features examined in these studies included shoes with soft (shore A-25), hard (shore A-58), flared (20°), beveled (10°) and tread soles as well as shoes with high collars and open- and closed-back shoes. These shoes were also evaluated on common household surfaces in wet and dry conditions.

RESULTS AND DISCUSSION

What do older people wear around the home? Slippers were the most popular choice of household shoe for both males (31.7%) and females (25.6%) who wore shoes around the home (81.1%). Household shoe choice was significantly related to gender such that, older females wore Ugg boots more often than older males (χ^2 = 4.78; p = 0.029) and older males wore athletic shoes more often than older females (χ^2 = 6.09; p = 0.014; see Figure 1).

What shoe features are safe for older people? Contrary to what was expected, shoes with flared, beveled or tread soles did not improve balance control in older people. However, hard-soled shoes positively influenced balance control whereas soft-soled shoes were detrimental to balance. That is, older people displayed a more conservative walking style when they wore soft-soled shoes, particularly when the postural control system was challenged, such as when walking and stopping on wet surfaces. Wearing shoes with a high collar lead to reduced postural sway and choice reaction time stepping, increased maximal balance range, and had a positive effect on balance control during ambulation. Open-back shoes had a negative effect on the gait of older females due to the need for increased control of the ankle muscles to keep these shoes on their feet.

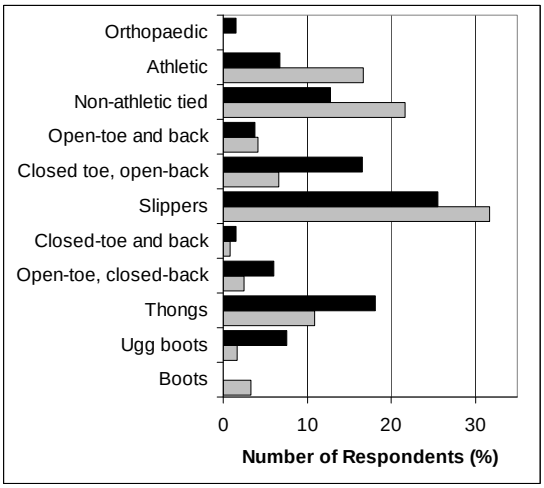

Figure 1: Household footwear worn by older females (n = 222; black) and older males (n = 208; grey).

CONCLUSIONS

Shoes are one of the most important clothing items for older people. As shoes are typically selected based on comfort, we must design a selection of comfortable, safe household shoes suited to the unique needs of older people. Evidence now exists that closed-back shoes with hard soles appear safe for older people. If easy to don, high shoe collars may provide additional stability. It must be acknowledged that these studies investigated safe shoe design by systematically examining one shoe feature in isolation. While this work should be extended, if we are truly going to design safe household shoes, future research should also assess how combinations of shoe features affect balance and gait in healthy and pathological older adults. Once safe household shoes are identified, we must then investigate whether providing older people with these shoes reduces the incidence of home falls in the community environment.

REFERENCES

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